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| APPLICATION NO.                                                                                  | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--------------------------------------------------------------------------------------------------|-------------|----------------------|---------------------|------------------|
| 10/046,926                                                                                       | 01/13/2002  | Steven Teig          | SPLX.P0085          | 3333             |
| 48947                                                                                            | 7590        | 06/06/2005           | EXAMINER            |                  |
| STATTLER, JOHANSEN, AND ADELI LLP<br>1875 CENTURY PARK EAST SUITE 1050<br>CENTURY CITY, CA 90067 |             |                      | SIEK, VUTHE         |                  |
|                                                                                                  |             |                      | ART UNIT            | PAPER NUMBER     |
|                                                                                                  |             |                      | 2825                |                  |
| DATE MAILED: 06/06/2005                                                                          |             |                      |                     |                  |

Please find below and/or attached an Office communication concerning this application or proceeding.

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|                              |                                      |                                    |  |
|------------------------------|--------------------------------------|------------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/046,926 | <b>Applicant(s)</b><br>TEIG ET AL. |  |
|                              | <b>Examiner</b><br>Vuthe Siek        | <b>Art Unit</b><br>2825            |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 15 March 2005.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 6-15,21 and 22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 6-12,21 and 22 is/are rejected.
- 7) ☒ Claim(s) 13-15 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |                                                                                                                        |                                                                                         |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)                                            | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____                                                |

### DETAILED ACTION

1. This office action is in response to application 10/046,926 and amendment filed on 3/15/2005. Claims 6-15 and 21-22 remain pending in the application.

#### ***Claim Rejections - 35 USC § 102***

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 6-12 and 21-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Das et al., "Channel Routing in Manhattan-Diagonal Model," IEEE, 1995, pp. 43-48.

4. As to claims 6, 8, 21 and 22, Das et al. teach a method of defining routes for nets in a region of circuit layout, wherein each net has a set of pins (pages 43-47) by dividing an IC design into sub-regions, where the sub-regions including pins for interconnecting between logic elements within the sub-regions comprising a) using a first set of lines to measure length of the routes (Manhattan grid or diagonal grid, Fig. 1); b) using a second set of lines to measure congestion of routes (segment wires of Manhattan grid or diagonal grid, Figs. 1-12); c) using a third set of lines to partition the region into a first set of sub-regions (Manhattan grid or diagonal grid are used to divide a region into plurality of sub-regions, Fig. 1); and for each net, identifying a route that traverses a group of first-set sub-regions that contain the net's set of pins (Das et al. describes in his article routing in Manhattan-Diagonal model having terminals, vias or pins in sub-regions, Figs. 1-12).

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5. As to claim 7, Fig. 1 shows the second set and third sets of lines are identical (Manhattan or diagonal grids).
6. As to claims 9-12, Das et al. teach measuring the length of each route by summing the length of each route segments in the route's set of route segments (Das et al. teach routing in Manhattan and diagonal models using Manhattan and diagonal grids, thus each route can be measured by summing the lengths of each route segment using Manhattan and diagonal models (Figs. 1-12); using the second set of lines comprising measuring the congestion of routes across the second set of lines (congestion of routes can be measured across Manhattan or diagonal wire segments; Figs. 1-12); the second set of lines define a plurality of congestion edges, wherein measuring the congestion of the routes comprising measuring the congestion of routes across the congestion edges (congestion of routes can be measured across Manhattan or diagonal wire segments; Figs. 1-12); once a route is completed, specifying each route only with respect to the route's segments that cross the congestion edges (Figs. 1-12).

***Allowable Subject Matter***

7. Claims 13-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The cited reference does not teach or fairly suggest a novel claimed limitation of identifying the route for each net comprising starting at a first-set sub-region that contains a pin of the net, successively specifying a routed segment that expands the route into a new first-set sub-region until the route

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traverses all group of sub-regions that contain the net's pins. Incorporating these claimed limitations in all independent claims would make all claims allowable.

***Remarks***

8. Applicant argued that Das does not teach a first set of lines to measure length and a second of lines to measure congestion. Examiner respectfully submits that the limitations have been clearly described as in the above rejections. Layout grid as taught Das comprises horizontal grid lines and diagonal grid lines which have been used to measure the length and congestion. The claimed limitations do not clearly recited as what a first set of lines and a second set of lines look like and different from the cited reference that are used to measure the length and congestion. Thus, Das's teachings meet the claimed limitations of first and second sets of lines. The third set of lines are set of lines that divided a region into sub-regions for routing such as shown in Fig. 6, at least there are two sub-regions as described for routing. Because each cell element comprises at least two net's pins (this is a known fact), therefore in order to connect between at least two cell elements, placement and routing tools must partition a region (arbitrary region) into two-subregions (referred to a third set of lines), to thereby the placement and routing tool is able to interconnect (perform routing) between the two cell elements or between the two-subregions. Das teaches channel routing area (referred to as routing area or routing region) using diagonal routing model and Manhattan routing model to provide better utilization of routing space, reduce wire length and hence area and delay. The objective of routing is to connect all the terminals specified by a given net list with minimum number of track w (channel width or congestion or

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number of intersections), thus minimizing channel area (routing area), reducing via count and/or wire length. The density (d) of channel (congestion or routing capacity) is the maximum allowable number of nets crossing a column in the channel. Accordingly, the teachings of Das meet the broad claimed limitations. Applicant(s) are also directed attention to Andreev et al. (6,324,674), where the patent also teaches all claimed limitations except the above allowable subject matter as indicated.

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

**Conclusion**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vuthe Siek whose telephone number is (571) 272-1906. The examiner can normally be reached on Increase Flextime.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Vuthe Siek

  
**VUTHE SIEK**  
**PRIMARY EXAMINER**